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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,706	02/27/2004	Yung-Chang Chen		7577

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT PAPER NUMBER

1762

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/789,706

Applicant(s)

CHEN ET AL.

Examiner

Kirsten C Jolley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Claim 8 is objected to because of the following informalities: In claim 8, line 4, the phrase "so as to have the photoresist occupies said recesses" is awkward language. The Examiner suggests replacing "occupies" with --occupying--. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiu (US 5,858,475).

Chiu discloses a method for coating photoresist on a substrate comprising: forming grooves/recesses and protrusions on a substrate; applying photoresist on the substrate; and vibrating the substrate so that the photoresist forms a uniform coating over the grooves/recesses and protrusions (see Figures 3A-3B and col. 2, lines 26-32). Chiu uses an ultrasonic vibrator to vibrate the photoresist coating, and ultrasonic vibration waves would vibrate the substrate in both vertical and horizontal directions. The grooves in Figures 3A-3B appear to be parallel and contiguous to each other.

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4. Claims 1, 4, 7-8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Akram et al. (US 5,609,995).

Akram et al. discloses a method of coating photoresist onto a substrate comprising: forming grooves/recesses and protrusions on a substrate; applying photoresist on the substrate; and vibrating the substrate. Akram et al. illustrates spraying on the substrate in Figure 3. Akram et al. teaches that the substrate is vibrated in vertical direction in col. 5, lines 19-21. It is noted that Akram et al. teaches that a uniform thickness/distribution of photoresist is achieved with its invention (col. 2, lines 30-33 and col. 5, lines 50-52).

#### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4-5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiu as applied to claims 1-2 and 6-10 above, and further in view of Takamori et al. (US 6,635,113).

Chiu discloses coating photoresist on a substrate having grooves/recesses and protrusions, as discussed above in section 3. Chiu lacks a teaching of how the photoresist coating is applied to the substrate, including the use of one or more nozzles. One skilled in the art would have been motivated to look to the prior art of other photoresist coatings that are vibrated to achieve uniformity to learn of exemplary coating means. Takamori et

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al. discloses a method for coating a substrate with photoresist using a two-part process: first supplying the resist solution using one or more nozzles, including slit nozzles; and then spreading the resist solution by vibrating the substrate to make the film thickness uniform in a horizontal direction (see Figures 11-14 and col. 10, lines 35-60; and col. 12, lines 11-14). It would have been obvious to have used the coating applicator system of Takamori et al. in the photoresist coating method of Chiu with the expectation of successful results since Takamori et al. likewise teaches that when vibration is combined with its application method using one or more nozzles, including slit nozzles, then a uniform coating is achieved, and because Chiu is silent and not limiting with regard to a particular applicator system. Further, it is the Examiner's position that it would have been obvious for one having ordinary skill in the art to have applied the photoresist to spaced apart locations above the apexes of the protrusions of the substrate because Chiu teaches that the coating material flows from the peaks to the valleys during its vibrating step (col. 1, lines 40-41 and col. 2, lines 9-11). If the photoresist is applied to the valleys/grooves of the substrate, then vibration would be ineffective because vibration cannot easily make the coating material flow back upwards.

7. Claims 1-3 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoura et al. (US 2003/0053015) in view of Chiu.

Minoura et al. discloses a method of making an array having grooves/recesses and protrusions that are contiguous and parallel to each and which have a triangular cross section. Minoura et al. discloses on page 21 and illustrates in Figures 35A-E a method of making an LCD device. One step not illustrated is a step of applying a resist mask on the

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array (paragraph [0289]), however Minoura et al. does not provide any details as to how the resist mask layer is formed. One having ordinary skill in the art would have been motivated to look to the prior art for teachings of how to prepare a uniform resist film on a surface having a series of grooves/recesses and protrusions. Chiu is cited for its teaching of how to form a uniform resist coating on a non-uniform substrate, as discussed above in section 3. It would have been obvious for one having ordinary skill in the art to have used the resist coating and vibrating method of Chiu in order to provide a uniform resist mask coating on the array of Minoura et al. with the expectation of successful results since Chiu discloses how to successfully coat a substrate having topography of peaks and valleys.

### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Parodi et al. (US 5,798,140) is cited to illustrate its teaching of chuck for oscillating/vibrating resist-coated wafers in a horizontal direction.


Kitano et al. (US 6,616,760) is cited for its teaching of a scan coating process of applying photoresist coating followed by ultrasonic vibration to spread the coating evenly (col. 18).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Thursday and every other Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on 571-272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kirsten C Jolley  
Patent Examiner  
Art Unit 1762

kcj